

**Claims.**

1. A shredder apparatus for shredding wet chip materials into granular wet chips, said apparatus comprising:

5 a frame;

a shaft attached to said frame, said shaft having a length and a first end and a second end;

10 a bearing assembly disposed on said shaft and located inwardly from said shaft ends;

15 a rotatable cylindrical shaped rotor having a first end and second end and a length less than said shaft length, said rotor being disposed on said bearing assembly;

a plurality of spaced first shredder members attached to and rotatable with said rotor;

20 a plurality of spaced second shredder members attached to said frame, said second shredder members being positioned relative to said first shredder members whereby a first shredder member and a second shredder member are adapted to cooperate to shred wet chips; and,

25 a drive assembly for rotating said rotor while said shaft remains in a fixed position whereby upon actuation of said drive assembly, said rotor will rotate causing said first and second shredder members to cooperate to shred wet chip material in said shredder apparatus.

2. A shredder apparatus in accordance with claim 1 in which the diameter of said shaft is reduced in size for a portion extending inwardly from each shaft end for a distance along the length of the shaft;

30 said bearing assembly comprises first and second bearings, said first bearing being seated on said shaft at a portion of said reduced shaft diameter and at a

distance inwardly from one shaft end and said second bearing being seated on said shaft at the location of said remaining reduced shaft diameter portion and at a distance inwardly from said remaining shaft end.

5           3. A shredder apparatus in accordance with claim 1 or 2 and further including first and second seal members, said first seal member being disposed on said shaft inwardly of said first shaft end and said second seal member being disposed on said shaft inwardly of said second shaft end.

10           4. A shredder apparatus in accordance with claim 3 in which said first seal member is positioned at said first rotor end and said second seal member is positioned at said second rotor end.

15           5. A shredder apparatus in accordance with claim 1 or 4 in which said first rotatable shredder members each comprise a shredder wheel having a plurality of spaced shredder arms extending outwardly therefrom and said second shredder members each comprise a comb member attached to said frame.

20           6. A shredder apparatus in accordance with claim 1 and further including a dropout tray attached to said frame.

25           7. A shredder apparatus in accordance with claim 1 or 5 in which said rotor rotates in a direction opposite to the direction of flow of wet chip material entering said shredder apparatus.

8. A shredder apparatus in accordance with claim 5 in which said

comb members each include a first comb portion having an opening and adapted to seat on said rotor; and, a comb arm attached to said frame.

9. A shredder apparatus in accordance with claim 8 in which said comb arm is keyed to said frame and said comb member is free from rotation with said rotor.

5

10. A shredder apparatus in accordance with claim 1 or 5 and further including a spacer disposed between said first shredder members for spacing said first shredder members from one another.

10

11. A shredder apparatus in accordance with claim 5 in which said shaft is tapered along said reduced diameter shaft portions.

15

12. A shredder apparatus in accordance with claim 2 or 5 in which said rotor is recessed at each rotor end and one of said bearings is disposed in one of said rotor recesses and said remaining bearing is disposed in said remaining rotor recess.

20

13. A shredder apparatus for shredding wet chip materials, said apparatus comprising:

a frame;

a shaft having first and second shaft ends and a length; said shaft attached to said frame at the location of said first and second shaft ends;

a bearing assembly seated on said shaft;

25

a rotatable cylindrical shaped rotor having a first end and a second end and a length less than said shaft length, said rotor being disposed over said shaft and seated on said bearing assembly;

a first seal member disposed on said shaft and located at said first rotor end;

a second seal member disposed on said shaft and located at said second rotor end;

5 a drive assembly for rotating said rotor while said shaft remains in a fixed position;

a plurality of spaced first shredder members attached to said rotatable rotor for rotation with said rotor; and,

10 a plurality of spaced second shredder members attached to said frame and free from rotation, said first and second shredder members being adapted to cooperate to shred wet chip material when said rotor is rotated.

14. A shredder apparatus in accordance with claim 13 wherein said shaft has a first reduced diameter portion for a distance extending inwardly from said first shaft end and a second reduced diameter portion for a distance extending from said second shaft end; and,

said bearing assembly comprising two bearings, one of said bearings being seated on said first reduced diameter shaft portion and said remaining bearing being seated on said remaining reduced diameter shaft portion.

20

15. A shredder apparatus in accordance with claim 13 or 14 in which said first shredder members each comprise a shredder wheel having a plurality of spaced shredder arms extending outwardly from said wheel.

25

16. A shredder apparatus in accordance with claim 15 in which said second shredder members each comprise a comb member having a first portion seated on said rotor but free from rotation with said rotor; and, an arm attached to said frame.

17. A shredder apparatus in accordance with claim 16 in which said comb arm is keyed to said frame.

18. A shredder apparatus in accordance with claim 16 in which said 5 first comb portion has an opening therein for receipt of said rotor.

19. A shredder apparatus in accordance with claim 13 in which said frame includes a first sidewall;

10 a second mounting sidewall spaced from said first sidewall;

15 a top wall extending over said first and mounting sidewalls; and,

20 said drive assembly disposed in the space between said first and second sidewalls, said enclosed drive assembly including a motor drive shaft assembly; and, a sprocket assembly attached to said motor drive shaft assembly and said rotor.

25 20. A shredder apparatus in accordance with claim 1 or 13 and further including spring means disposed on said rotor compressing said first and second shredder members.

21. A shredder apparatus in accordance with claim 1 or 13 and further including a dropout tray attached to said frame.

22. A shredder apparatus for shredding wet chip materials into granular wet chips, said apparatus comprising:

25 a frame;  
a shaft attached to said frame, said shaft having a first end and a second end;

a bearing assembly disposed on said shaft;

a rotatable cylindrical shaped rotor having a first end and second end, said rotor being disposed on said bearing assembly;

5 a plurality of spaced first shredder members attached to and rotatable with said rotor;

a plurality of spaced second shredder members attached to said frame, said second shredder members being positioned relative to said first shredder members whereby a first shredder member and a second shredder member are adapted to cooperate to shred wet chips; and,

10 a drive assembly for rotating said rotor while said shaft remains in a fixed position whereby, upon actuation of said drive assembly, said rotor will rotate causing said first and second shredder members to cooperate to shred wet chip material in said shredder apparatus.

15 23. A shredder apparatus in accordance with claim 22 and further including a seal assembly disposed between said rotor and said shaft for sealing said bearing assembly.

24. A shredder assembly in accordance with claim 22 in which said bearing assembly comprises a first bearing and a second bearing; said first bearing being located contiguous to said first shaft end and said second bearing being located contiguous to said second shaft end.

25. A shredder assembly in accordance with claim 24 in which said seal assembly comprises a first seal located contiguous to said first shaft end and a second seal located contiguous to said second shaft end, said first and second bearings being located between said first and second seals.

26. A shredder assembly in accordance with claim 22 in which said first rotatable shredder members each comprise a shredder wheel having a plurality of spaced shredder arms extending outwardly therefrom and said second members each comprise a comb member attached to said frame.

5

27. A shredder apparatus in accordance with claim 26 in which said comb members each comprise a first comb portion having an opening and adapted to seat on said rotor and a comb arm attached to said frame.

10.

28. A shredder apparatus in accordance with claim 27 in which said comb arm is keyed to said frame.

15.

29. A shredder apparatus in accordance with claim 22 and further including a spacer disposed between said first shredder members for spacing first shredder members from one another.

20.

30. A shredder apparatus in accordance with claim 25 wherein said shaft is reduced in diameter for a portion extending inwardly from each end of said shaft;

25.

20. said first bearing is seated on a reduced shaft portion at one shaft end and said second bearing seated on said reduced shaft portion at said second shaft end.

31. The method of shredding wet chip materials into granular wet chips with a shredder apparatus comprising:

25

a frame;

a shaft attached to said frame, said shaft having a length and a first end and a second end;

a bearing assembly disposed on said shaft and located inwardly from said shaft ends;

5 a rotatable cylindrical shaped rotor having a first end and second end and a length less than said shaft length, said rotor being disposed on said bearing assembly;

a plurality of spaced first shredder members attached to said rotatable with said rotor;

10 a plurality of spaced second shredder members attached to said frame, said second shredder members being positioned relative to said first shredder members whereby a first shredder member and a second shredder member are adapted to cooperate to shred wet chips; and,

15 a drive assembly for rotating said rotor while said shaft remains in a fixed position whereby upon actuation of said drive assembly, said rotor will rotate causing said first and second shredder members to cooperate to shred wet chip material in said shredder apparatus;

said method including the steps of:

directing wet chip materials to be shredded in a first direction toward said shredder apparatus;

20 rotating said rotor in a direction opposite said first direction whereby said first shredder members contact said wet chip materials to be shredded and lift said wet chip material upward; and,

delivering said wet chip material to a shredder location where said first and second shredder members engage and cooperate to shred said wet chip material.

25 32. The method claim of claim 31 and further including the step of allowing shredded wet chips to fall by gravity toward the bottom of said shredder apparatus.

33. The method of claim 31 or 32 and further including the step of removing solid objects from said shredder during the course of shredding wet chip material.

5 34. The method of claim 31 wherein said first shredder members each comprise a shredder wheel having a plurality of spaced shredder arms and said shredder arms engage the wet chip material to be shredded.

10 35. The method of claim 31 and further includes the step of rotating the rotor over the shaft.

36. A shredder apparatus in accordance with claim 8 in which said comb members each include a second comb arm spaced from said first comb arm.

15 37. A shredder apparatus in accordance with claim 36 in which at least said second comb member is serrated.

38. A shredder apparatus in accordance with claim 5 or 8 in which each of said shredder arms is grooved along the length of said shredder arm.

20 39. A shredder apparatus for shredding wet chip materials into granular wet chips, said apparatus comprising:

a frame;

25 a shaft attached to said frame, said shaft having a length and a first end and a second end;

a bearing assembly disposed on said shaft and located inwardly from said shaft ends;

a rotatable cylindrical shaped rotor having a first end and second end and a length less than said shaft length, said rotor being disposed on said bearing assembly;

5. a plurality of spaced first shredder members attached to and rotatable with said rotor;

10. a plurality of spaced second shredder members attached to said frame, said second shredder members having a plurality of spaced arms and being positioned relative to said first shredder members whereby a first shredder member and a second shredder member are adapted to cooperate to shred wet chips at the location of said two second shredder arms; and,

15. a drive assembly for rotating said rotor while said shaft remains in a fixed position whereby upon actuation of said drive assembly, said rotor will rotate causing said first and second shredder members to cooperate to shred wet chip material in said shredder apparatus.

15

40. A shredder apparatus in accordance with claim 39 in which the diameter of said shaft is reduced in size for a portion extending inwardly from each shaft end for a distance along the length of the shaft; and,

20. said bearing assembly comprises first and second bearings, said first bearing being seated on said shaft at a portion of said reduced shaft diameter and at a distance inwardly from one shaft end and said second bearing being seated on said shaft at the location of said remaining reduced shaft diameter portion and at a distance inwardly from said remaining shaft end.

25

41. A shredder apparatus in accordance with claim 39 or 40 and further including first and second seal members, said first seal member being disposed on said shaft inwardly of said first shaft end and said second seal member being disposed on said shaft inwardly of said second shaft end.

42. A shredder apparatus in accordance with claim 41 in which said first seal member is positioned at said first rotor end and said second seal member is positioned at said second rotor end.

5 43. A shredder apparatus in accordance with claim 39 or 42 in which said first rotatable shredder members each comprise a shredder wheel having a plurality of spaced shredder arms extending outwardly therefrom and said second shredder members each comprise a comb member having a portion attached to said frame and a plurality of spaced comb arms extending from said comb portion.

10

44. The method of shredding wet chip materials into granular wet chips with a shredder apparatus comprising:

15

a frame;

an elongated shaft member attached to said frame, said shaft having a

length and a first end and a second end;

20 a bearing assembly disposed on said shaft and located inwardly from said shaft ends;

a rotatable cylindrical shaped rotor having a first end and second end and a length less than said shaft length, said rotor being disposed on said bearing assembly;

a plurality of spaced first shredder members attached to and rotatable with said rotor;

25 a plurality of spaced second shredder members attached to said frame, said second shredder members each having spaced comb shredding arm and being positioned relative to said first shredder members whereby a first shredder member and a second shredder member are adapted to cooperate to shred wet chips; and,

a drive assembly for rotating said rotor while said shaft remains in a fixed position whereby upon actuation of said drive assembly, said rotor will rotate

causing said first and second shredder members to cooperate to shred wet chip material in said shredder apparatus;

    said method including the steps of:

        directing wet chip materials to be shredded in a first direction toward  
5    said shredder apparatus;

        rotating said rotor to travel in the same direction as the wet chip material to be separated, and,

        delivering said wet chip material to a shredder location where said first and second shredder members engage and cooperate to shred said wet chip material.

10

45. The method of claim 44 and further including the step of reversing said rotor rotation thereby causing said first shredder members to travel in a second direction for a discrete distance.

15

46. The method of claim 45 and further including the step of again reversing said rotor rotation thereby allowing said first shredding members to travel in said first direction.

20

47. The method of claim 44 in which said drive assembly is actuated to change rotor directions upon an unwanted heavy object contacting said second shredding member arm when said wet chip material is traveling in said first direction.

25

48. The method of claim 44 and further including the step of removing solid objects from said shredder during the course of shredding wet chip material.